

WHAT IS CLAIMED IS:

1. A toner supply unit comprising:

a toner container that holds a toner, the toner container having a toner discharging portion for discharging
5 the toner;

a toner container holder that detachably holds the toner container in such a manner that the toner discharging portion faces in a direction of gravity;

an insertion member that is inserted into the toner
10 discharging portion while the toner container is held by the toner container holder, wherein toner is filled into the toner container through the insertion member; and

a preventing unit for preventing toner contamination due to toner leakage through the self-closing valve, the
15 preventing unit including a self-closing valve, provided to the toner discharging portion, which is opened or closed by removing or inserting the insertion member from/into the toner discharging portion.

20 2. The toner supply unit according to claim 1, wherein the self-closing valve is a foamed elastic body having slits into which the insertion member is removed from or inserted into.

3. The toner supply unit according to claim 1, wherein the toner discharging portion is provided with a plurality of the self-closing valves, while at least one of the self-closing valves is made of foamed elastic body.

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4. The toner supply unit according to claim 1, wherein the preventing unit further includes a guide unit which matches the insertion member with a slit position in the self-closing valve while the toner container is held by the
10 toner container holder.

5. The toner supply unit according to claim 4, wherein the guide unit includes a guide convex portion erected in the vicinity of the insertion member; and a guide concave
15 portion, provided on the toner container, that engages with the guide convex portion.

6. The toner supply unit according to claim 5, wherein the height of the guide convex portion is larger than the
20 height of the insertion member.

7. The toner supply unit according to claim 5, wherein shapes of the guide convex portion and the guide concave portion are changed depending on the type of toner that is
25 to be stored in the toner container.

8. The toner supply unit according to claim 1, wherein
the preventing unit is so constructed that the insertion
member comprises an insertion portion to be inserted into
the slits in the self-closing valve and a compression portion
5 provided on side portions of the insertion portion for
compressing the self-closing valve.

9. The toner supply unit according to claim 8, wherein
the length of the insertion portion is smaller than a natural
10 length of the self-closing valve and larger than its
compressed length.

10. The toner supply unit according to claim 8, wherein
an opening leading to a toner aisle in the insertion member
15 is formed in the compression portion.

11. The toner supply unit according to claim 1, wherein
the preventing unit is so constructed that the self-closing
valve is made of the foamed elastic body is disposed with
20 space in an insertion direction of the insertion member.

12. The toner supply unit according to claim 11, wherein
a movable seal, which is moved by removing or inserting the
insertion member, is provided in the space in the insertion
25 member.

13. The toner supply unit according to claim 1, wherein
the preventing unit includes a toner leakage preventing unit
which the insertion member engages and when the toner
container is loaded or unloaded, is movable in a vertical
5 direction following the container.

14. The toner supply unit according to claim 13, wherein
the toner leakage preventing unit is comprised of a seal
made of foamed elastic body provided on a face opposing the
10 toner container, a supporting frame for supporting the seal
and an elastic unit for applying a pushing-up force to the
supporting frame.

15. The toner supply unit according to claim 13, wherein
15 the toner leakage preventing unit is held by the elastic
unit at the highest position and pushed down from the highest
position to the lowest position resisting an action of the
elastic unit by the toner container held in by the toner
container holder.

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16. The toner supply unit according to claim 14, wherein
the supporting frame is formed in a concave shape having
a guide hole which the insertion member engages substantially
in the center thereof while a seal is provided inside the
25 concave formation.

17. The toner supply unit according to claim 16, wherein
a jaw portion is formed on top of the supporting frame, so
that when the toner container is removed from the toner
container holder, the toner container is raised by the jaw
portion.

18. The toner supply unit according to claim 1, wherein
the preventing unit is comprised of an opening/closing valve,
in which when the insertion member is removed, a valve body
10 rests on a valve seat provided on the discharging portion
and a self-closing valve made of foamed elastic body provided
outside the opening/closing valve in the discharging
portion.

15 19. The toner supply unit according to claim 18, wherein
the opening/closing valve is provided with an elastic member
which always urges the valve body in a direction that it
rests on the valve seat.

20 20. The toner supply unit according to claim 19, wherein
a coil spring is used as the elastic member.

21. The toner supply unit according to claim 18, wherein
an elastic body is used for the valve seat.

22. A toner supply unit comprising:

a toner container that holds a toner, the toner container having a toner discharging portion for discharging the toner;

5 a toner container holder that detachably holds the toner container in such a manner that the toner discharging portion faces in a direction of gravity;

10 an insertion member that is inserted into the toner discharging portion while the toner container is held by the toner container holder, wherein toner is filled into the toner container through the insertion member, the insertion member having a top surface and an opening on the top surface; and

15 a self-closing valve, provided to the toner discharging portion, which is opened or closed by removing or inserting the insertion member from/into the toner discharging portion.

23. The toner supply unit according to claim 22, wherein

20 the opening leads to a toner supply aisle.

24. A toner supply unit comprising:

a toner container that holds a toner, the toner container having a toner discharging portion for discharging the toner;

a toner container holder that detachably holds the toner container in such a manner that the toner discharging portion faces in a direction of gravity;

an insertion member that is inserted into the toner discharging portion while the toner container is held by the toner container holder, wherein toner is filled into the toner container through the insertion member; and

10 a suction unit having an suction port in the vicinity of a toner discharging portion of the toner container held by the toner container holder.

25. The toner supply unit according to claim 24, wherein the suction unit is comprised of an air pump for feeding air into the toner container.

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26. An image forming apparatus comprising a toner supply unit, the toner supply unit including,

a toner container that holds a toner, the toner container having a toner discharging portion for discharging 20 the toner;

a toner container holder that detachably holds the toner container in such a manner that the toner discharging portion faces in a direction opposite to the direction of gravity;

25 an insertion member that is inserted into the toner

discharging portion while the toner container is held by the toner container holder, wherein toner is filled into the toner container through the insertion member; and

a preventing unit for preventing toner contamination

5 due to toner leakage through the self-closing valve, the preventing unit including a self-closing valve, provided to the toner discharging portion, which is opened or closed by removing or inserting the insertion member from/into the toner discharging portion.

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27. An image forming apparatus comprising a toner supply unit, the toner supply unit including,

a toner container that holds a toner, the toner container having a toner discharging portion for discharging
15 the toner;

a toner container holder that detachably holds the toner container in such a manner that the toner discharging portion faces in a direction of gravity;

an insertion member that is inserted into the toner
20 discharging portion while the toner container is held by the toner container holder, wherein toner is filled into the toner container through the insertion member, the insertion member having a top surface and an opening on the top surface; and

25 a self-closing valve, provided to the toner

discharging portion, which is opened or closed by removing or inserting the insertion member from/into the toner discharging portion.

5 28. An image forming apparatus comprising a toner supply unit, the toner supply unit including,

a toner container that holds a toner, the toner container having a toner discharging portion for discharging the toner;

10 a toner container holder that detachably holds the toner container in such a manner that the toner discharging portion faces in a direction of gravity;

an insertion member that is inserted into the toner discharging portion while the toner container is held by
15 the toner container holder, wherein toner is filled into the toner container through the insertion member; and

a suction unit having an suction port in the vicinity of a toner discharging portion of the toner container held by the toner container holder.